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Determinant of export diversification: An empirical analysis in the case of SADC countries

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ABSTRACT

The objective of this work is to identify the explanatory factors determining the diversification of exports in SADC (Southern African Development Community) countries members during the period 1990-2018. We regress the indicator of export diversification, measured successively by the Herfindahl-Hirschman index on a set of explanatory variables. Using an applied next-generation panel data approach such as panel unit root, panel cointegration, fully modified OLS (FMOLS), and dynamic ordinary least squares (DOLS). The result of the unit root tests for all these variables are stationary at their first difference and are integrated of order one. Our results show that there is a long-term relationship between the diversification of exports and the Gross Domestic Product per capita of housing (GDP), openness to trade, accumulation of human and physical capital, foreign direct investment. All of its variables are the main explanatory factors for the diversification of exports in SADC countries. contrariwise, corruption and inflation are obstacles on the diversification of exports in the economic sub-region of SADC.

Introduction

The debate on structural transformation has been marked in recent years by a resurgence, especially since the work of McMillan and Rodrik (2011). However, it goes back from the work of Lewis (1954), Chenery (1960, 1961,1977). Structural transformation refers to the reallocation of economic activity from sectors with low productivity to those where it is high, thus making it possible to maintain strong, sustainable, and inclusive growth. Moreover, how do we concretely measure structural transformation? One difficulty, however, lies in moving from this conceptual definition to an operational measure. Different measures are commonly used in the literature. It can be measured by changes in the contribution of sectors to GDP, in particular, manufacturing value added (Page, 2012) or by labour movements between sectors (McMillan and Rodrik, 2011; McMillan and Harttgen, 2014).

Moreover, in the early stages of development, structural transformation, and diversification are closely linked (IMF, 2014). That is why, according to Cadot et al. (2011), structural transformation can translate into the diversification of exports to new products and trading partners as well as the improvement of the quality of the existing product. The concentration of exports is, in fact, a symptom of delay in structural transformation and that the development of the manufacturing sector is generally accompanied by diversification of exported products (Cadot et al., 2016). From a theoretical perspective, export diversification has important challenges for low-income economies. According to Cherif (2018), like any economy, exports are fundamentally crucial for developing countries, insofar as they generate not only jobs but also the currencies for imports of the equipment necessary for economic growth. Therefore, export diversification can be seen as a change in the composition of the current export structure of an economy. However, in the case of the sixteen countries of the Southern African Development Community (SADC) Which are (Angola, Botswana, Comoros, the Democratic Republic of the Congo, Eswatini, Lesotho, Madagascar, Malawi, Mozambique, Mauritius, Namibia, Seychelles, South Africa, United Republic of Tanzania, Zambia, Zimbabwe), we see that the economy is, substantially, focused on the production of primary goods IMF (2019). So it is clearly established that the main weakness of the SADC economy is that it is a "rent economy," marked by real shortcomings in specialization or domestic investment SADC (2020). On the whole, it is polarized on the exports of basic products, in this case, petroleum and agricultural products, which creates vertical imbalances in the sub-region and

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proportionately suffers from the numerous fluctuations in international prices of raw materials. Moreover, since most of the commodities they export are denominated in US dollars, they become vulnerable to terms of trade shocks and the volatility of their export earnings.

The question we ask ourselves is how SADC countries members could move from regressive specialization to economic diversification leading to sustainable growth?

To address this concern, we suggest the main hypothesis: diversification plays a vital role in the development and growth of an economy. Indeed, it can help increase factor productivity, boost investment, and stabilize export earnings. It also provides advantages linked to the dilution of macroeconomic risks, conditioned the theories of growth, development, and international trade to better appropriate the development process (Berthélemy, 2005).

To do this, we regress the export diversification indicator on a set of explanatory variables.

Given the small size of our sample (in individuals and in time), we use efficient econometric techniques for panel data, in particular the FMOLS (Fully Modified Ordinary Least Squares) method. It corrects problems that may lead to spurious regressions to estimate a cointegration relation. (For more details, see Hurlin and Mignon, 2007).

The rest of this article is organized as follows: Section 2 is devoted to the literature review; Section 3 presents the methodology and presents the empirical results, thus allowing to identify the main factors contributing to the diversification of exports in SADC countries and section 4 concludes.

Literature review

The question of diversification is not new in the literature. It represents a major stake for economic development and economic growth. Chenery and Syrquin (1975) recommended structural development models based on export diversification from primary to manufactured products.

Nevertheless, the resurgence of ideas on the need for diversification of economies, especially in developing countries, to the detriment of specialization in basic products lies on several reasons.

First, diversification increases country's capacity for resilience in the face of cyclical hazards (external terms of trade shocks, high volatility in commodity prices, ...), to which they are exposed, especially countries that export raw materials (Berthélemy, 2005). It thus contributes to strengthening the macroeconomic stability of the country and reduces the investment risks, which are now spread over a larger portfolio of economic sectors (Acemoglu and Zilibotti, 1997). Then, the diversification of exported products contributes to the growth of the productivity of exporting companies (Melitz, 2003), stimulates economic growth (Feenstra and Alii, 1999; Lederman and Maloney, 2003; Ben Hammouda et al., 2006; Berthélemy and Söderling, 2001) and consequently promotes economic development.

Following an extensive literature devoted to the benefits of diversification, the following question arises:

What are the explanatory factors for the diversification of exports? Numerous contributions revealed a number of factors contributing to the diversification of exports.

The first study, of an international comparative nature, on the determinants of economic diversification, was carried out by Imbs and Wacziarg (2003). They sought in particular to test the relationship between a country's level of development and diversification of its exports, and They found that diversification is initially increasing, then decreasing, depending on the country's per capita income. Berthélemy (2005), seeking to test the hypothesis of Imbs and Wacziarg (2003) he introduces the population variable to control the effect of the size of the country, confirms the nonlinear effect of development on diversification but with a slightly higher transition threshold. Subsequently, while several empirical studies confirm the nonlinear effect of per capita income on diversification (Cadot et al., 2016; Agosin et al., 2012; Koren and Tenreyro 2007), others argue the opposite (Parteka and Tamberi, 2013). Empirical work considers other factors that impact diversification such as, human capital, trade openness, and the exchange rate. Indeed, a high level of human capital reduces the concentration of exported products (Agosin et al., 2012; Elhiraik and Mbate, 2014). This is because the accumulation of human capital allows countries to change their patterns of specialization from commodities to manufactures or services with a greater input of knowledge. In addition, according to the theory of endogenous growth, human capital can play an essential role in the process of diversification of exported products. However, if the results of De Benedictis (2009) show only a weak positive effect of human capital on the diversification of exports, those of Cadot et al. (2016) find a negatively significant effect.

Regarding trade openness, there are no conclusive results on its effect on export diversification. For some, a strong openness to the outside promotes international specialization (Ricardian style)countries on the products for which they had a comparative advantage (Ferdous, 2011), and It, therefore, reinforces the concentration of exports on a small number of goods. This result is confirmed by the empirical work of Agosin et al. (2012). On the other hand, other studies based on intra-industry trade justify the importance of external openness in the diversification process by the fact of the lowering of protectionist barriers, which facilitates the emergence of trade in the absence of comparative advantages (Berthélemy, 2005). Thus, Berthélemy (2005) finds that trade openness is a positive and significant determinant of export diversification.

Dutt et al. (2009) also confirm this result while showing that WTO membership and preferential trade agreements are favourable to the diversification of exports. It should also be noted that financial deepening, by reducing the liquidity constraints of exporting companies, can induce export diversification (Manova. K, 2008).

The appreciation of the real exchange rate can also be a significant constraint on export diversification (Ben Hammouda et al., 2006). A higher and uncompetitive exchange rate induces less diversification (Thi Anh-Dao, 2017; IMF, 2014; Ferdous, 2011). In contrast, a low real exchange rate can, in particular, encourage the diversification of export products and trading partners (De-Piñeres and Ferrantino, 1997) reduce the risk associated with investing in new sectors, especially those intended for foreign markets (Razmi, 2013). Finally, among the factors which condition the process of country diversification, we can cite structural factors such as the size of the market and the endowment of natural resources. First, the size of the market measured by the population can be, according to new theories of international trade, an obstacle to the diversification of the productive system because it prevents the achievement of the economies of scale that characterize modern sectors (VERGNE and AUSSEUR, 2015). Second, there is a consensus in the literature that countries rich in natural resources (African countries in particular) tend to concentrate their exports on primary commodities. This largely explains the low diversification of their export portfolio (Cadot et al., 2016; IMF, 2017; Bebczuk and Berrettoni, 2006; Starosta , 2010). Thus, let us recall that with the Hecksher-Ohlin model of international trade, a large endowment of natural resources favours specialization to the detriment of diversification.

Export diversification is generally proposed as a mechanism that will allow countries to manage risks arising from volatility transmitted by trade and to reap the rewards of openness (Haddad et al., 2013). Diversification is generally viewed as a strategy for reducing volatility. It offers protection against external shocks by allowing countries to access a wider range of global value chains and insurance schemes. An export diversification strategy is recommended to mitigate the volatility of a country's production by reducing vulnerability to demand shocks in the global market (Balavac et al., 2016). In the analysis of the relationship between diversification and growth, most of the authors used macro-econometric models where they sought to test the correlation between the level of growth and different indices of diversification. At this level, we should mention the work of Berthélemy (2005), who used a particular methodology. First, he uses the traditional methodology of decomposing the contribution of different factors to growth. He then uses a Cobb Douglas production function that he decomposes into different contributions: capital, labor, and total factor productivity. Subsequently, he seeks through an econometric regression to estimate the different factors that explain the total factor productivity. At this level, he retained several explanatory variables, including the diversification index, development financing, opening up of the economy, human capital. This methodology is interesting because it makes it possible, through total factor productivity, to show the contribution of diversification to economic growth.

Regarding the modelling of export diversification in growth, Sadorsky (2012) uses the technical panel cointegration regression to examine the relationship between capital, production, labor, energy, and trade (exports and imports) in a sample of 7 Southern countries American countries covering the period 1980-2007. A panel The VECM model is proposed and estimated. Panel cointegration tests show a long term relationship between variables. The short-term dynamics show a two-way feedback relationship between production and exports, production, and imports. Mohammad (2020) modeled and analyzed the short- and long-term effects of export diversification on economic growth using panel data from the Gulf Cooperation Council (GCC) for the period 1992-2017. His work presents the Distributed / Autoregressive Grouped Shift Group (ARDL / PMG) to achieve his goal. The diversification of exports measured by the Theil index. The Pedroni panel cointegration test confirms that the variables are cointegrated, while PMG estimates indicate a significant positive long-term relationship between export diversification and real gross domestic product (GDP) growth, no significant effect of diversification short-term exports. The results reveal a significant impact of trade openness growth on real GDP growth, confirming the long-term and short-term relationship between trade openness growth and economic growth in GCC countries. In his study, the role of trade openness, export diversification and institutions as potential predictors of output volatility in 25 transition countries during the period 1996–2010. Balavac (2016) results found by the latter suggest that diversification may not mitigate the effects of opening output volatility for transition countries already at medium or higher levels of diversification, but may nevertheless have this effect at lower levels of diversification.

Malick (2019) identified the explanatory factors for the diversification of exports in the UEMOA countries over the period 1995-2015, Using the FMOLS (Fully Modified Ordinary Least Squares) method. The results show that openness to trade, the accumulation of human and physical capital, a competitive real exchange rate and the endowment of natural resources constitute the main explanatory factors for the diversification of exports in the WAEMU countries. His results seem to be approximate with our results obtained. Chia (2016) examined the validity of the growth hypothesis driven by exports (ELG) in some countries of sub-Saharan Africa (SSA) for the period 1985 to 2014. A new generation panel data approach was applied, such as panel unit root, cointegrating panel, fully modified OLS (FMOLS), and dynamic ordinary least squares (DOLS).

Estimate FMOLS and DOLS have shown a positive impact of investments, public spending and exports on economic growth. Therefore, the results proved that the export-oriented growth strategy is valid in the countries of sub-Saharan Africa. However, despite this vast literature devoted to the determinants of diversification, it should be noted that few studies, if not none to our knowledge, have been explicitly devoted to the countries of the Southern African Development Community (SADC). Nonetheless, these SADC countries are characterized by a low diversification of their productive structure, concentrated on a few basic products

(IMF, 2017). These countries are, in fact, subject to fluctuations in the anchor currency, the French franc until 1998, then the euro, and can therefore poorly withstand the phases of appreciation of the latter against other currencies such as the US dollar (Diop et al., 2018). For these reasons, this article aims mainly to contribute to the literature on the determinants of export diversification, specifically in SADC countries.

Research and Methodology

The empirical work of Agosin et al. (2011) and Berthélemy (2005), by different alternating indices, find almost the same results. However, the degree of diversification should reflect both the number of products in a country's export basket and the distribution of their individual shares (Dao et al., 2017).

For this study, we choose to use the Herfindhal-Hirschman index to measure export diversification. The Herfindhal-Hirschman index that we are using is the export concentration index, normalized into 0 and 1. A higher value (close to 1) indicates a lower diversification (therefore a higher degree of concentration).

The following formula gives the index:

$$HH_j = \frac{\sqrt{\sum_{i=1}^{n}\left(\frac{x_{ij}}{X_j}\right)} - \sqrt{1/n}}{1 - \sqrt{1/n}}$$

Where HHj is the export concentration index (diversification) of country j, xij: the export value of product **i** by country j and n: the number of products (revision 3 of the SITC at group level to three digits) and Xj: the value of the country's total exports. In addition, it should be remembered that structural transformation results in the reallocation of economic activity from low productivity sectors (Agriculture) to those where it is higher (manufacturing sector). For this reason, we use the share of manufacturing exports in total exports as an alternative indicator of export diversification.

Unit root tests

We have adopted several scenarios on behalf of our estimates. The model chosen for this research is inspired by the empirical literature on the subject. More specifically, it is based on the work of Chia (2016), Malick et al. (2019), and Dao (2017).

In this study, we performed the precondition of the panel unit root tests before being passed to the cointegration test panel. The result of unit root tests for all variables used in the panel cointegration is given in Table 1. It shows that all seven variables, namely, export diversification, FDI, GDP, inflation, openness, human capital, and corruption, are not - stationary at the level. These variables are stationary at their first difference and are integrated of order one (I (1)). Thus, to perform the analysis, all the variables are made stationary by differentiating them once.

The main problem that arises in panel data, as in time series, is that of the consequences of a regression involving nonstationary and non-cointegrated variables. Specifically, although the ordinary least squares (OLS) estimators of cointegrating vectors are super-convergent, their distribution is asymptotically biased and depends on nuisance parameters associated with the presence of serial correlation in the data (Hurlin and Mignon, 2007), especially in the presence of heterogeneity (Kao and Chen, 2000). Given these problems, which can lead to spurious regressions to estimate a cointegrating relation, it is necessary to use an efficient estimation method. Indeed, Kao and Chiang (2000) have shown that these two methods are effective in the case of panel data, as they lead to estimators asymptotically distributed according to a normal distribution with zero means. Thus, Pedroni (1996) and Phillips and Moon (1999) found similar results for the FMOLS method. In contrast, the tests proposed by Pesaran and Shin (IPS) (2003) solved the serial autocorrelation problem of Levin and Lin by assuming heterogeneity between units in a dynamic panel setting.

The panel unit root testing equation for IPS is as shown below:

$\Delta y_{i,t} = \overline{w_i} + \rho y_{i,t-1} \sum_{i=0}^{p_i} \rho_i \Delta Y_{i,t-j} + \vartheta_{i,t}$ i = 1, 2, 3, … , N; t = 1, 2, 3, …, T

Where Y_{it}, represents each variable in the model, $\overline{w_i}$ Is the individual fixed effect, and ρ is selected to make the residuals Decorrelated over time. The null hypothesis is $p_i = 0$ for all i while the alternative hypothesis is $p_i < 0$ for some i =1,…, N_1 and $p_i = 0$ for i = N_1 + 1,…, N.

These tests are less restrictive and more powerful compared to the first-generation tests developed by Levin and Lin (2002) and Hurlin & Mignon (2006). The drawback of the first-generation tests is that they do not take into account the heterogeneity of the autoregressive coefficient. Whereas the tests proposed by (IPS) have solved the serial autocorrelation problem of Levin and Lin by assuming heterogeneity between units in a dynamic panel setting.

Empirical Data and Analysis

To run the model, we used a panel-type sample, taken from the World Bank (WDI) database with the exception of those from the Herfindahl-Hirschman (HH) index which was collected from the UNCTAD centre's database of 16 countries that made up the SADC

economic region. The study covers the period 1990-2018. The choice of explanatory variables for export diversification follows the theories of international trade and the results of empirical studies (Agosin et al., 2012), in particular those on African countries (Cadot et al., 2011, 2016; Elhiraik and Mbate, 2014). Indeed, the dependent variable is the diversification index (div), measures the absolute deviation of the structure of a country's exports from the world structure, it ranges on a scale of 0 to 1. According to (Cadot et al., 2011, 2016; Elhiraik and Mbate, 2014) for whom the diversification of exports consists of on the one hand creating new export lines and on the other hand an increase in exports towards the technological frontier, leads us to define six (6) variables of interest (independent) in particular: The investment is also represented here by the Foreign Direct Investments (FDI) is also supposed to have a positive effect on the diversification of exports. It is seen as a catalyst for economic growth, especially through improved productivity of domestic firms and increased exports. GDP per capita, we expect GDP to have a positive impact on export diversification. Trade openness (OUV), this indicator is measured by the ratio to GDP of the sum of exports and imports. Trade openness can be unfavorable or favorable to the diversification of exports. Human Capital (HCAP) In addition, we would expect the relationship between export diversification and human capital accumulation to be ambiguous. On the one hand, the accumulation of human capital supports the diversification of exports because it allows countries to specialize in more diversified products, but this relationship can also become negative. In fact, human capital development can also allow countries to better specialize in exports of the products they initially produced, as can openness. We also expect inflation (INF) to have a negative relationship with export diversification; as predicted by many traditional economic theories, inflation makes domestic products less affordable than foreign products and, by the way, deters exports and export diversification. Finally, corruption (CORRUP) also has a dissuasive effect on the quality of institutions in countries and therefore hinders the business environment. Therefore, we expect the relationship between corruption and export diversification to be negative.

Results and Discussion

The result of unit root tests for all variables used in the panel cointegration namely, export diversification, FDI, GDP, inflation, openness, human capital, and corruption, are not - stationary at the level.

Table 1: Panel Unit-Root Test Results.

		Level		**First Difference**	
Variables	**Methods**	**Statistic**	**Prob.****	**Statistic**	**Prob.****
EXPDIV	Levin, Lin & Chu t*	-1.06825	0.1309	-26.7299	0.0000
	ADF – Fisher Chi-square	38.3463	0.2037	646.939	0.0000
	PP – Fisher Chi-square	33.2337	0.4069	814.912	0.0000
GDP	Levin, Lin & Chu t*	26.4218	1.0000	9.56964	0.0000
	ADF – Fisher Chi-square	0.67711	1.0000	99.0053	0.0000
	PP – Fisher Chi-square	0.56534	1.0000	107.850	0.0000
FDI	Levin, Lin & Chu t*	-2.28183	0.1112	-19.8389	0.0000
	ADF – Fisher Chi-square	6.8578	0.2181	419.753	0.0001
	PP – Fisher Chi-square	8.9899	0.1620	919.206	0.0000
INF	Levin, Lin & Chu t*	-4.3365	0.4230	-21.8143	0.0000
	ADF – Fisher Chi-square	17.3512	0.6201	453.993	0.0031
	PP – Fisher Chi-square	22.2781	0.5201	1148.56	0.0000
OPEN	Levin, Lin & Chu t*	-0.67815	0.2488	-21.0386	0.0000
	ADF – Fisher Chi-square	34.7523	0.3381	396.398	0.0000
	PP – Fisher Chi-square	32.8861	0.4235	450.352	0.0000
HCAP	Levin, Lin & Chu t*	4.15449	1.0000	-11.3898	0.0000
	ADF – Fisher Chi-square	21.1139	0.8843	202.698	0.0000
	PP – Fisher Chi-square	6.47282	1.0000	239.663	0.0000
CORRUP	Levin, Lin & Chu t*	0.02503	0.5100	-3.40388	0.0003
	ADF – Fisher Chi-square	-1.15581	0.1239	163.011	0.0000
	PP – Fisher Chi-square	71.8141	0.0001	681.859	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi Square distribution. All other tests assume asymptotic normality.

Panel cointegration test

The results of the Pedroni panel cointegration test all support the cointegrating relationship between the variables of our model, bot for an individual intercept, intercept and trend, and for no interception, the probability values being less than 5% for most results (Table 5). By confirming that the variables are stationary at their first difference and Co-integrated, the panel cointegration model is estimated with the first difference of all variables. The analysis included the calculation of individual fully modified OLS countries (FMOLS) and FMOLS panel groups and the cointegration of panels.

Table 2: Pedroni Panel Cointegration Test with Individual Intercept

Alternative hypothesis: common AR coefs. (within-dimension)	**Statistic**	**Prob.**	**Weighted statistic**	**Prob.**
Panel v-Statistic	-0.365975	0.6428	-0.798452	0.7877
Panel rho-Statistic	2.459825	0.0930	1.435621	0.9244
Panel PP-Statistic	1.002373	0.0419	-2.016379	0.0219
Panel ADF-Statistic	0.035197	0.5140	-2.208712	0.0136
Alternative hypothesis: individual AR coefs. (between-dimension)	Statistic	Prob.		
Group rho-Statistic	2.883258	0.0080		
Group PP-Statistic	-1.563015	0.0590		
Group ADF-Statistic	-1.84264	0.0327		

Table 3: Pedroni Panel Cointegration Test Without Trend

Alternative hypothesis: common AR coefs. (within-dimension)	**Statistic**	**Prob.**	**Weighted Statistic**	**Prob.**
Panel v-Statistic	-1.97434	0.0758	-2.205167	0.0163
Panel rho-Statistic	3.969998	0.0000	3.004355	0.0287
Panel PP-Statistic	2.780273	0.0373	-0.69232	0.0444
Panel ADF-Statistic	1.721258	0.0574	-0.975061	0.0148
Alternative hypothesis: individual AR coefs. (between-dimension)	Statistic	Prob.		
Group rho-Statistic	4.314569	0.0000		
Group PP-Statistic	-1.09718	0.1363		
Group ADF-Statistic	-1.08484	0.0390		

Table 4: Pedroni Panel Cointegration Test Without Trend

Alternative hypothesis: common AR coefs. (within-dimension)	**Statistic**	**Prob.**	**Weighted Statistic**	**Prob.**
Panel v-Statistic	-2.989704	0.0986	-4.054139	0.0010
Panel rho-Statistic	1.353425	0.0120	2.005925	0.0776
Panel PP-Statistic	-0.790444	0.2146	-0.532435	0.0272
Panel ADF-Statistic	3.112254	0.0447	-0.12821	0.0490
Alternative hypothesis: individual AR coefs. (between-dimension)	Statistic	Prob.		
Group rho-Statistic	3.429757	0.0997		
Group PP-Statistic	-1.109162	0.0337		
Group ADF-Statistic	-0.095039	0.0221		

The results of the FMOLS estimate of the model panel group (Table 5) tell us that there is a positive long-term relationship between export diversification, GDP, Foreign direct investment, trade openness, and physical capital. They are all favourable to the

diversification of exports in SADC countries. On the other hand, inflation and corruption do not contribute to the process of diversification.

More specifically:

The per capita GDP contributes positively and significantly to the diversification of exports. Other studies, notably those of Lederman and Maloney (2007), have also highlighted the fact that export diversification has a positive influence on economic growth. Regarding the foreign direct investment variable, we notice that it contributes positively and significantly to the process of export diversification in SADC countries. A one percentage point increase in investment leads to a 0.36 percentage point increase in the diversification of SADC countries' exports. However, its magnitude of economic growth remains low. Several authors have also demonstrated this weakness in FDI flows to boost economic growth.

These authors stress that the FDI flows that are supposed to support economic activity in sub-Saharan Africa are more oriented towards the exploitation of natural resource rents. According to Sachs and Warner (2001), the exploitation of natural resources in Africa promotes bad governance, patronage, and corruption. This opaque management of the exploitation of these resources by these FDI flows leads to political and security instability, which paradoxically benefits multinationals that go into war economy mode to plunder resources.

A 10% opening of the economy to the outside reduces the concentration of exports by 0.04%, despite its weak effect, does not necessarily lead to deeper diversification. This result is confirmed by the empirical work of Agosin et al. (2012); Berthélemy (2005). This conclusion does not agree with that of (Ben Hammouda, 2006), who states that it is the poor specialization of African countries, which has negative effects on their economic growth.

As for the accumulation of physical and human capital, despite its weak effect, is favorable to the process of diversification. Our results go hand in hand with what (Agosin et al., 2012; Elhiraik and Mbate, 2014) found that a high level of human capital reduces the concentration of exported products. for the macroeconomic stability variables, the sign associated with inflation (INF) is negative, instead, it favors concentration. High inflation levels undermine the prospects for diversification.

This result is not surprising since diversification requires the emergence and development of new industries or new sectors capable of meeting domestic demand while being competitive in the international market. This result is in line with that found by (Ben Hammouda et al., 2006; Dao, 2017; IMF, 2014; Ferdous, 2011) that the real exchange rate can also be a major obstacle to export diversification. Regarding corruption, it has an ambiguous effect on diversification; a negative and significant sign means that despite the efforts made in terms of improving the institutional quality, this has not allowed the economy of sub-regions to strengthen their governance. As governance structures improve, the country's ability to expand and diversify its export base strengthens. These results are in line with our expectations.

Table 5: Panel Group FMOLS Results

Variable	Coefficient	t-Statistic	Prob.
GDP	1.26E-10	2.060557	0.0582
FDI	0.362892	6.818199	0.0028
INF	-0.061161	-0.84633	0.0182
OPEN	0.004854	1.719016	0.0047
HCAP	0.073023	4.110079	0.0297
CORRUP	-0.019679	-3.203863	0.1015

However, the individual FMOLS results by country are ambiguous (Table 6 see Annex). Although the results are similar to those of the FMOLS panel group for some countries, namely: Angola, Lesotho, Mauritania, Zambia, South Africa, Tanzania, and Seychelles, where there is a long-term positive relationship between export diversification and per capita GDP, FDI, opening up and accumulation of human capital; and the negative relationship with corruption and inflation; for other countries in the region, the results are different.

In fact, for some of these countries, specifically Zimbabwe, Eswatini, Madagascar, DRC, and Botswana, the relationship between export diversification and openness is negative, corroborating the idea that these countries might have specialized more in the exports of the products they were initially produced, instead of diversifying their exports with openness.

For other countries like Mozambique, Malawi, or Comoros, the relationship between export diversification and human capital accumulation is negative and also supports the hypothesis that human capital accumulation could allow specialization and the export of commodities from these countries. While for Namibia, there is a negative relationship between export diversification and both openness and accumulation of human capital, besides inflation and corruption.

Conclusion

This work aims to identify the main explanatory factors of export diversification by focusing specifically on SADC countries. We regressed an indicator of export diversification measured alternately by the Herfindhal-Hirschman index on a set of variables over the period 1990-2018. Using a next generation panel data approach is applied such as panel unit root, panel cointegration, fully modified OLS (FMOLS) and Dynamic Ordinary Least Squares (DOLS).

The results show that trade openness, investment, human capital accumulation and GDP lead to the diversification of exports in SADC countries. On the other hand, inflation and corruption are major handicaps to the diversification process.

Despite the study results, the economic reality and in view of the very unstable economic environment of SADC countries, export diversification remains a favorable avenue for protecting the economy from risks. SADC member countries should strive to increase the level of investment, improve governance by fighting corruption, adopt bold fiscal policies and ensure macroeconomic stability. These policies will enhance export diversification, which will ultimately increase the contribution of total factor productivity to economic growth and take advantage of preferences and world trade liberalization.

References

Acemoglu, D. And Zilibotti, F. (1997). Was Prometheus Unbound By Chance? Risk Diversification And Growth. *Journal Of Political Economy* ,105(4), 709-751.

Agosin, R., Alvarez, R. And C. B. Ortega. (2012). Determinants Of Export Diversification Around The World: 1962–2000. *The World Economy*, 35, 295–315.

Balavac, M., Pugh, G. (2016). The Link Between Trade Openness, Export Diversification, Institutions And Output Volatility In Transition Countries. *Economic Systems*, 40(2), 273-287.

Bebczuk, Rn. Et Berrettoni, Nd. (2006). Diversification: Towards A New Paradigm For Africa's Development. African Trade Policy Center, Work In Progress No. 35, Economic Commission For Africa. Caf Research Program On Development Issues.

Ben Hammouda, H., Karingi, Sn., Njuguna, An. And Sadni-Jallab, M. (2006). Diversification: Towards A New Paradigm For Africa.S Development. African Trade Policy Center, Work In Progress No. 35, Economic Commission For Africa. Empirical Analysis," Caf Research Program On Development Issues.

Berthélemy, J. And Söderling, L. (2001). The Role Of Capital Accumulation, Adjustment And Structural Change For Economic Take- Off: Empirical Evidence From African Growth Episodes. *World Development*, 29(2), 323-343.

Berthélemy, J. C (2005). Commerce International Et Diversification Economique. Revue D'économie Politique, 115, 591-611.

Cadot, O., Carrère, C. And Strauss-Kahn, V. (2011). Export Diversification: What.S Behind The Hump? *The Review Of Economics And Statistics*, 93(2), 590.

Cadot, O., De Melo, J., Plane, P., Wagner, L. And Woldemichael, T. (2016). Industrialisation Et Transformation Structurelle : L'afrique Sub-Saharienne Peut-Elle Se Développer Sans Usines ? *Revue D'économie Du Développement*, 2016(2), 19-49.

Chenery H. (1961). Comparative Advantage And Development Policy. *American Economic Review*, 51(1), 18-51.

Chenery H. (1977). Transitional Growth And World Industrialization. In Ohlin B. (Ed.), *The International Allocation Of Economic Activity*, Holmes And Meier, New York.

Chenery, H. (1960). Patterns Of Industrial Growth, *American Economic Review*, 50(4), 624-654.

Chenery, H. Et Syrquin, M. (1975). Patterns Of Development 1950-1970. Oxford University Press For The World Bank, New York.

Cherif, R., Hasanov, F. And L. Wang. (2018). Sharp Instrument: A Stab At Identifying *The Causes Of Economic Growth*. Imf Working Paper 18/117. International Monetary Fund, Washington, Dc.

Chia Yee Ee. (2016). Export-Led Growth Hypothesis: Empirical Evidence From Selected Sub-Saharan African Countries. *Procedia Economics And Finance* 35 (2016), 232 – 240.

De Benedictis, L., Gallegati, M. And Tamberi, M. (2009). Overall Trade Specialization And Economic Development: Countries Diversify. *Review Of World Economics* 145: 375.

De-Piñeres, G. And Ferrantino, M. (1997). Export Diversification And Structural Dynamics In The Growth Process: The Case Of Chile, *Journal Of Development Economics*, 52(2): 375-391.

Diop, M., Goujon, M. Et Niang, B. B (2018). L'impact Des Déséquilibres Du Taux De Change Réel Sur La Performance Du Secteur Manufacturier Au Sénégal. À Paraitre Dans La Revue D'économie Du Développement.

Dutt, P., Mihov, I. And Van Zandt, T. (2009). Trade Diversification And Economic Development. Mimeo (Insead). Available Online:

Elhiraik, Ab. And Mbate, M. (2014). Assessing The Determinants Of Export Diversification In Africa. *Applied Econometrics And International Development*, 14(1), 147–160.

Feenstra R. C. And Alii (1999). Testing Endogenous Growth In South Korea And Taiwan. *Journal Of Development Economics*, 60, 317-341.

Ferdous, F. B. (2011). Export Diversification In East Asian Economies: Some Factors Affecting The Scenario. *International Journal Of Social Science And Humanity*. 1(1).

Haddad, M., Pancaro, C.And Saborowski, C., (2013). Trade Openness Reduces Growth Volatility When Countries Are Well Diversified. Can. J. Econ. 46 (2), 765– 790.

Http://Scholar.Google.De/Scholar?Oi=Bibsandcluster15641237450692600313

Hurlin, C. Et Mignon, V. (2006). Une Synthèse Des Tests De Racine Unitaire Sur Données De Panel. Economie Et Prévision, Minefi - Direction De La Prévision, 169, 253-294.

Hurlin, C. Et Mignon, V. (2007). Une Synthèse Des Tests De Cointégration Sur Données De Panel. Economie & Prévision 2007/4, 241-265.

IMBS, J. And Wacziarg, R. (2003). Stages Of Diversification, American Economic Review, 93(1), 63-86.

IMF (2014). Regional Spillovers In Sub-Saharan Africa. IMF Spillover Note 18/01, Washington, Dc.

IMF (2017). Sustaining Long-Run Growth And Macroeconomic Stability In Low-Income Counties - The Role Of Structural Transformation And Diversification, Washington Dc.

IMF (2019). Sub-Saharan Africa Recovery Amid Elevated Uncertainty. IMF Regional Economic Outlook. Washington, Dc, April.

Kao, C. And Chiang, Mh. (2000). On The Estimation And Inference Of A Cointegrated Regression In Panel Data, Advances In Econometrics, 15, Edited By B. Baltagiet C. Kao, 179-222, Elsevier Science.

Koren, M. And Tenreyro, S. (2007). Volatility And Development. *The Quarterly Journal Of Economics*, 122, 243–87.

Lederman, D. And Maloney, W. (2003). Trade Structure And Growth., Policy Research Working Paper No. 3025, April (Washington, Dc: World Bank).

Levin A., Lin C.F. Et Chu J. (2002). Unit Root Tests In Panel Data: Asymptotic And Finite Sample Properties, *Journal Of Econometrics*, 108, 1-24.

Lewis, A. (1954). Economic Development With Unlimited Supplies Of Labor Manchester: Manchester School.

Malick, D. (2019). Facteurs De Diversification Des Exportations : Une Analyse Empirique Au Cas Des Pays De L'uemoa. *Finance & Finance Internationale,* Issn: 2489-1290.

Manova, K. (2008), Credit Constraints, Heterogeneous Firms, And International Trade. Nber Wp 14531, December (Cambridge, Ma: *National Bank Of Economic Research*). Paper No. 17143.

Mcmillan, M. And Harttgen, K. (2014). What Is Driving The African Growth Miracle. Nber Working Paper No. 20077.

Mcmillan, M. And Rodrik, D. (2011). Globalization, Structural Change, And Productivity Growth. Nber Working Paper No. 17143.

Melitz, M. (2003). The Impact Of Trade On Intra-Industry Reallocations And Aggregate Industry Productivity. *Econometrica*, 71, 6, 1695–725.

Mohammad, A. And Ala', G. (2020). Modeling The Exports Diversification In The Oil Countries Growth: The Case Of Gulf Cooperation Council Countries, *International Journal Of Energy Economics And Policy*, 2146-4553.

Page, J. (2012). Can Africa Industrialize? *Journal Of African Economies*, 21(2), 86 124.

Parteka, A. And Tamberi, M. (2013). What Determines Export Diversification In The Development Process? Empirical Assessment. *The World Economy* 36: 807–26.

Pedroni, P. (1996). Fully Modified Ols For Heterogeneous Cointegrated Panels And The Case Of Purchasing Power Parity, Working Paper In Economics, Indiana University. Phillips, Pcb (1995).

Pesaran, M. (2003). Fully-Modified Ols For Heterogeneous Cointegrated Panels. In Advances In Econometrics: Nonstationary Panels, Panel Cointegration And Dynamic Panels, 15, 93–150.

Phillips, M. (1999). Fully Modified Least Squares And Vector Auto Regression. *Econometrica*, 63(5),1023-1078.

Razmi, A. (2013). The Exchange Rate, Diversification And Distribution In A Modified Ricardian Model With A Continuum Of Goods. *The Manchester School*, 81(3), 356-385.

Sachs, J. And Warner, A. (2001). Natural Resource Abundance And Economic Growth. Nber Working Paper No. 5398.

Sadc. (2020). Stratégie De Communication Et De Promotion De La Sadc'' Isbn No : 978-99968-435-4-9.

Sadorsky, P. (2012). Energy Consumption, Output And Trade In South America. *Energy Economics*, 34(2), 476-488.

Starosta, F. (2010). How Costly Is Rent Seeking To Diversification: An Empirical Approach. Proceeding Of The German Development Economics Conference, Hannover 2010, Stock, J. And Watson, M. (1993). A Simple Estimator Of Cointegrating Vectors In Higher Order Integrated Systems, *Econometrica*, 61, 783-820.

Thi Anh-Dao, T., Minh Hong, P. And Diaw, D. (2017). Export Diversification And Real Exchange Rate In Emerging Latin America And Asia: A South–North Vs South-South Decomposition. The Journal Of International Trade & Economic Development.

Vergne, C Et Antoine, A. (2015). La Croissance De L'afrique Subsaharienne: Diversité Des Trajectoires Et Des Processus De Transformation Structurelle. No Macroéconomie & Développement, 18.

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Appendix

Here we show the *Results from FMOLS for Individual states of the SADEC.*

Angola

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	1.34E-11	6.71E-12	1.913960	0.0452
FDI	0.010050	0.001966	5303971	0.0079
INF	-0.014003	0.002728	-0.520295	0.9596
OPEN	0.002801	0.001084	2.590608	0.0021
HCAP	0.019202	0.006922	2.776304	0.0883
CORRUP	-0.012069	0.005720	-2.110230	0.0678

Comoros

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	1.60E-09	7.70E-10	2.082844	0.0576
FDI	0.085461	0.073419	1.164017	0.6023
INF	-0.054611	0.029920	-1.825230	0.0910
OPEN	-0.033761	0.004542	-7.432463	0.0000
HCAP	0.021189	0.006902	3.069877	0.0090
CORRUP	-0.093918	0.013342	-7.039541	0.0000

Botswana

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	1.84E-11	6.32E-12	2.705401	0.0009
FDI	0.006650	0.002276	2.921146	0.0266
INF	-0.010748	0.018188	-0.590956	0.5761
OPEN	0.080803	0.016528	4.489009	0.6422
HCAP	-0.004140	0.001204	-3.365318	0.0274
CORRUP	-0.308115	0.022564	-1.689203	0.1421

Democratic Republic of The Congo

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	2.45E-12	1.35E-12	1.832012	0.0197
FDI	0.375590	0.139070	2.700717	0.0164
INF	-0.025578	0.023081	1.108185	0.2852
OPEN	0.003641	0.014213	0.256154	0.8013
HCAP	-0.001696	0.073739	-0.022999	0.9820
CORRUP	-0.023376	0.011743	-1.990675	0.0651

Lesotho

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	1.28E-11	1.98E-12	6.178243	0.0000
FDI	0.118537	0.023736	4.780949	0.0050
INF	-0.002433	0.000926	-2.626547	0.0221
OPEN	0.003222	0.001816	1.774546	0.0213
HCAP_	0.005610	0.006551	0.856353	0.4086
CORRUP	-0.021628	0.021823	-0.991063	0.3412

Madagascar

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	2.29E-10	1.07E-10	2.143697	0.0222
FDI	0.337106	0.622621	0.541430	0.6115
INF	-0.041659	0.097436	-0.470812	0.9637
OPEN	0.034880	0.015840	2.220197	0.0344
HCAP	-0.040562	0.088847	-0.456542	0.6671
CORRUPTION	-0.114787	0.056705	-2.036483	0.0048

Malawi

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	7.23E-10	3.97E-10	1.818185	0.0119
FDI	0.193107	0.180657	1.068913	0.3206
INF	-0.005701	0.006461	-0.882383	0.4068
OPEN	-0.110346	0.039755	-2.824342	0.0137
HCAP	0.121629	0.072917	1.710700	0.0108
CORRUP	-0.072454	0.031832	-2.276091	0.0570

Mauritius

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	1.54E-10	4.15E-11	3.715021	0.0099
FDI	0.026591	0.013407	1.977611	0.0127
INF	-0.053084	0.013446	-3.948041	0.0076
OPEN	0.001104	0.011650	0.094723	0.9276
HCAP	0.105343	0.041102	2.623284	0.0218
CORRUP	-0.011099	0.016391	-0.677135	0.5236

Mozambique

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	1.57E-09	5.30E-10	2.970774	0.0249
FDI	0.032878	0.015864	2.072554	0.0836
INF	-0.042184	0.015091	-2.621841	0.0126
OPEN	-0.005462	0.005574	-0.980004	0.3649
HCAP	0.023794	0.010833	2.196496	0.0704
CORRUP	-0.007992	0.013375	-0.597571	0.5720

Namibia

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	1.02E-13	5.80E-14	1.761591	0.0685
FDI	0.005391	0.014306	0.376857	0.7116
INF	-0.006447	0.002645	-2.437370	0.0277
OPEN	-0.014679	0.003062	-4.528011	0.0073
HCAP	-0.007038	0.005480	-1.284294	0.2185
CORRUP	-0.005848	0.003516	-1.651012	0.0605

Zambia

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	1.03E-14	6.06E-14	0.169565	0.8676
FDI	0.050397	0.023386	2.170319	0.0025
INF	-0.218040	0.094466	-2.229803	0.0519
OPEN	0.024810	0.011081	1.182524	0.0231
HCAP	0.010355	0.020698	0.500273	0.6241
CORRUP	-0.037777	0.015055	-2.509317	0.0241

Seychelle

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	5.91E-11	8.61E-11	0.686422	0.5029
FDI	0.396386	0.103706	3.822198	0.0017
INF	-0.115568	0.044940	-2.571626	0.0213
OPEN	0.010316	0.004942	2.518066	0.0310
HCAP	0.083570	0.044913	1.860702	0.0825
CORRUP	-0.026419	0.012900	-2.047935	0.0585

Eswatini

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	7.59E-13	1.46E-13	5.195603	0.0001
FDI	0.015446	0.092053	1.661841	0.0478
INF	-0.020949	0.013272	-1.578493	0.1353

OPEN	0.003138	0.007858	0.421970	0.9663
HCAP	-0.034087	0.010321	-3.302815	0.0048
CORRUP	-0.026264	0.009679	-2.227160	0.0273

Tanzania

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	1.34E-10	8.01E-11	1.669767	0.0144
FDI	0.034382	0.025408	1.362053	0.5436
INF	-0.019180	0.008906	-2.119840	0.0283
OPEN	3.54E-06	0.000187	0.018933	0.9851
HCAP	0.041444	0.010989	3.771565	0.0017
CORRUP	-0.081730	0.038291	-2.653018	0.0080

Zimbabwe

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	4.52E-13	1.98E-12	0.228261	0.8240
FDI	0.008329	0.021557	0.386363	0.7073
INF	-0.016310	0.007930	-2.056726	0.0668
OPEN	0.013109	0.005291	2.477398	0.0327
HCAP	-0.006561	0.003692	-1.808526	0.0122
CORRUP	-0.010293	0.007875	-1.307090	0.2204